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ABSTRACT

The idea that mass communication effects may decrease diversity among people or societies exposed to it arises constantly. However, discussions of mass media effects do not highlight differences between mass communications that "affect" people uniformly and messages that members of audiences "respond to" in similar ways. A number of modern theories concerning the effects of mass communication explicitly predict, or at least imply, homogenizing effects. The "mainstreaming" concept hypothesizes that television "cultivates" in heavy viewers an image of the world similar to that shown on the screen. A refinement of the global cultivation hypothesis, "resonance," is said to occur in instances where specific issues have particular salience to people's everyday reality (or even perceived reality) and the combination resonates and amplifies cultivation. In most instances, resonance increases differences between or among social groups. Even though theoretical ideas concerning the influence of mass communication upon stereotyping, public opinion and culture imply uniform audience responses, the literature contains almost no examples of methods designed to test hypotheses about the uniformity of individual responses. People within a society will not necessarily be more homogeneous following the introduction of some form of media content, even if the content contributes to uniformity among the individuals exposed to it. (Four pages of references are provided, and tables and graphs are included.) (NKA)

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Uniform Media Effects and Uniform Audience Responses

Abstract

This paper explicates a distinction between theories predicting uniform effects of mass communication and those implying relatively uniform audience responses to media content. For example, it points out that uniform effects of mass communication will not influence the within-group variation of people studied. The paper reviews theoretical ideas concerning the influence of mass communication upon stereotyping, public opinion, and culture that imply uniform audience responses. It also discusses ways of testing substantive hypotheses about the uniformity of knowledge, attitudes, and behavior among members of media audiences. It makes the point that a media effect that reduces the variability of averages for different social groups will not necessarily lessen diversity among individuals. In addition, it points out that people within a society will not necessarily be more homogeneous, following the introduction of some form of media content, even if the content contributes to uniformity among the individuals exposed to it.

Uniform Media Effects and Uniform Audience Responses

The idea that mass communication may decrease diversity among people or societies that are exposed to it appears continually. For example, Wilbur Schramm (1971, p. 52) said that the most potent long-term effects of mass communication may include "the gradual homogenization of images and behaviors over large populations, as a result of the universality of the mass media..." George Gerbner has often stressed the importance of common contributions of mass media "to viewers' otherwise diverse conceptions of the role of violence in life and society" (Gerbner, 1983, p. 357).

In recent years, many researchers (e.g., Noelle-Neumann, 1973; Roberts & Bachen, 1981) have revived among academics the popular idea that mass media can have powerful effects on their audiences. Standard discussions of media effects (e.g., Roberts & Maccoby, 1985) report an abandonment of both 1920s "hypodermic" theories assuming powerful, direct effects on people and the limited-effects model of mass-media impact that was influential during the 1950s and 1960s. Instead, research that searches for powerful mass-media effects only under certain conditions is described as a disciplinary norm (McLeod & Reeves, 1980; Roberts & Maccoby, 1985).

Such discussions do not highlight differences between mass communications that affect people uniformly and messages that members of audiences respond to in similar ways. Uniform effects occur when exposure leads to equal changes for everyone, leaving preexisting differences among people unchanged. To the extent that unexposed people

vary on a criterion of interest, however, uniform audience responses to mass communication can only occur because of what statisticians term interaction. An interaction, also referred to as a conditional effect, occurs when the impact of one thing upon another varies with one or more additional factors.

According to previous writers, the hypodermic idea about mass media effects suggested uniform effects of media content, at least to some extent. For example, McLeod and Becker (1974, p. 137) said that, at its worst, it implies that "media content equals audience effect." This is not the whole story, however. For one thing, Chaffee and Hochheimer (1985) recently have questioned to what extent the hypodermic analogy really describes early writings about media effects. In addition, a political scientist associated with early powerful effects assumptions, Harold Lasswell, wrote:

> In the Great Society it is no longer possible to fuse the waywardness of individuals in the furnace of the war dance; a newer and subtler instrument must weld thousands and even millions of human beings into one amalgamated mass of hate and will and hope. A new flame must burn out the canker of dissent and temper the steel of bellicose enthusiasm. The name of this new hammer and anvil of social solidarity is propaganda. (1927, pp. 220-221)

The quotation from Lasswell implies that the message stimuli will determine the audience response (cf., De Fleur & Ball-Rockeach, 1975), not equal the audience effect. Phrases such as "amalgamated mass" and "burn out the canker of dissent" clearly imply a unifying, rather than

uniform, effect of mediated propaganda. Therefore, no contradiction necessarily arises between certain implications of early ideas about the impact of propaganda and more-recent attempts at specifying conditionally powerful mass-communication influences.

Although early ideas about the effects of propaganda have lost most of their influence, a number of recent theoretical positions similarly predict homogenizing media influences. This article reviews these areas, after explicating the distinction between uniform media effects and uniform audience reactions. It also discusses little-known methods of testing uniformity hypotheses.

What Media-Effects Theories Imply

Figures 1 and 2 illustrate quite different, hypothetical effects of mass communication. In Figure 1, an experimenter studying the impact of televised violence upon aggressiveness in young people found that exposure yielded equal increases for males and females. The difference between the two groups remained constant, regardless of media exposure, as did response variability, within each level of exposure.

Figure 1 About Here

In Figure 2, an experimenter has studied the impact of a mass-mediated message on people's opinions about legalized abortion. The message advocated legalization of abortion when pregnancy threatens the life or health of a woman, but not when the woman wants it to avoid the responsibilities of motherhood. The dependent variable consisted of a

cumulative scale developed from numerous questions about situations in which abortion should be legal (cf., Gerbner, Gross, Morgan, & Signorielli, 1982). The audience included people who initially favored legal abortion for a woman who wants one in almost any circumstance and persons who favored laws prohibiting virtually all abortion. It also included people who initially took positions relatively consistent with the message. The message, a highly persuasive one, had its greatest effect on people with relatively extreme opinions. It had little or no impact, as measured, on those who initially tended to agree with it.

Figure 2 About Here

If the experimenter ignored the political ideology of respondents and measured effects in the traditional way, as a difference in mean attitudes, she or he would find identical average responses within both the treatment and control group. The experimenter might then conclude that the message had no impact.

Theories Predicting Response Uniformities

A number of modern theories concerning the effects of mass communication explicitly predict or at least imply homogenizing effects. Of these, the "mainstreaming" concept of George Gerbner and his associates at the University of Pennsylvania has received particularly wide attention. This idea evolved from Gerbner's research into the possibility that television "cultivates" in heavy viewers an image of the world similar to that shown on the screen. Initially, he and his

followers speculated that television may have a uniform impact on heavy viewers' perceptions of social reality (Gerbner, Gross, Morgan, & Signorielli, 1981a, p. 56). For example, the difference between heavy and light viewers' judgments of the likelihood that they would become crime victims might be the same within different social groups. Following data analyses, however, they supplemented the prediction of uniform effects by noting that in some situations, mainstreaming occurs. These researchers defined mainstreaming as "the expression of that commonality by heavy viewers in those demographic groups whose light viewers hold divergent views" (Gerbner et al., 1982, p. 104). A corollary of the mainstreaming concept, according to Cook, Kendzierski and Thomas (1983), is that individual heavy users of television should have less-varied attitudes than do light viewers.

Figure 3, based upon hypothetical data but similar to actual research results (cf. Gerbner, Gross, Morgan & Signorielli, 1986, p. 31), illustrates a mainstreaming pattern. The mean responses on a cultivation index of blacks and whites who are heavy viewers of television are more similar (one unit apart on a cultivation index) than are the mean responses of light users within each racial group (two units apart). Although the psychological mechanisms underlying mainstreaming have not been well described, it is seen as a relatively general, diachronic process.

Figure 3 About Here

The cultural indicators group (see Gerbner et al., 1986, p. 38) has described another refinement to the global cultivation hypothesis,

"resonance," as a phenomenon tending to increase differences between or among social groups (Cook et al., 1983). Resonance occurs in "instances where specific issues have particular salience to people's everyday reality (or even perceived reality) and the combination 'resonates' and amplifies cultivation" (Gerbner et al., 1981a, p. 43). For example, television programming that depicts blacks as the victims of criminal violence might increase blacks' scores on certain cultivation indices much more than it increases the scores of whites. Gerbner and his associates have described resonance as resulting from the "special salience of specific issues to specific groups at certain times" (Gerbner, Gross, Morgan, & Signorielli, 1981b, p. 274).

The key point here, however, is that forms of resonance could lead to relative uniformities among heavy viewers. The pattern displayed in Figure 3 might result not from general programming and mainstreaming, but from resonance--i.e., specific television programs with particular salience to the lives of whites. In most instances, resonance may increase differences between or among social groups, but it perhaps is best distinguished from mainstreaming as a result of relatively specific, rather than general, forms of programming.

Much of Gerbner's cultivation work exemplifies research into media contributions to audience stereotypes (McGuire, 1986). An old debate in the psychological literature concerns whether only beliefs that are held widely in society qualify as stereotypes (Miller, 1982). The most-common method of measuring stereotypes in psychology, which uses the adjectives that raters most often associate with ethnic groups, implies social sharing (Gardner, 1973). Social sharing, in turn, suggests a relative uniformity of response among media audiences. Given

this, tests of uniformity hypotheses could become a standard part of all future research into media-influenced stereotypes.

Other areas of modern theory implying uniform responses to mass communication include concerns that U.S. television programming weakens indigenous cultures in developing countries or in different regions of the United States (Lee, 1979; Morgan, 1986) and Elisabeth Noelle-Neumann's spiral-of-silence theory of public opinion (Noelle-Neumann, 1973; 1974).

That concerns about the impact of U.S. television upon people and societies with diverse cultures suggest conditional effects of mass communication often has been overlooked. Tan (1985), however, comes close to recognizing the point. She identified assumptions about the impact of U.S. media "imperialism" in the developing world with the silver-bullet (i.e., hypodermic) idea: "The orthodox view of audiences in the developing world is one that assumes every individual reacts to the foreign incoming information in absolutely the same way" (p. 4). In addition, Morgan (1986) used the mainstreaming concept in examining whether heavy users of television in various parts of the United States are more homogeneous than are light viewers.

The spiral-of-silence theory assumes that mediated messages generally are repetitious and consonant (Noelle-Neumann, 1973). Audience selective perception requires a diversity of media content, according to Noelle-Neumann. She claims that people tend to limit their public expression to opinions they perceive as socially acceptable, perceptions that media may influence. Therefore, the mass media are likely to contribute to a uniformity of individual expression over time.

Examining Individual and Group Uniformities

There are a number of ways to test hypotheses about media-influenced uniformities. Based upon theoretical expectations, one can examine the interaction between a media-orientation measure, such as exposure, and some characteristic of individuals, such as race or level of education. Most reported mainstreaming patterns (see Gerbner et al., 1986 for a review) test interactions or otherwise compare mean (or percentage) responses among members of various social groups at different levels of tv viewing. More globally, a researcher may compare the dispersion of persons high and low on a media-exposure variable (Perry, 1986).

Both forms of analysis provide important information. Their results, however, can be inconsistent. For example, the fact that a researcher finds an interactive, mainstreaming-type pattern does not mean that the heavy viewers studied will be more uniform overall than will the light viewers. It is quite possible to observe an mainstreaming effect on some dimension of perceived social reality even when heavy tv users, lumped together, show more dispersion on the dependent variable than do light users.

Table 1 and Figures 3 and 4 illustrate this point with hypothetical data. In Table 1, a person's score on a mean-world index, a common cultivation indicator, is influenced by main effects and interactions involving three factors--race, amount of television viewing, and the perceived reality of television entertainment programming. An interactive, mainstreaming effect of race and television viewing occurs. Figure 3, which pictures the data collapsed across levels of perceived reality, illustrates it. On the other hand,

another interaction--between television viewing and perceived reality--tends to increase differences among heavy viewers on the dependent variable (Potter, 1986 reports a similar pattern involving the "magic window" dimension of perceived reality). This can be seen in Figure 4 by looking at the lines for either racial group alone.

Table 1 About Here

Assume that there are four observations within each of the eight cells of Table 1, that two observations per group are at the within-cell mean, and one each is a unit below and above this average. The unbiased sample variance[1] within each group would be .67. A comparison of sample variances for all observations within each level of television viewing indicates that despite the mainstreaming pattern, heavy viewers are more dispersed than are light viewers (light viewers' $s^2 = 1.867$; heavy viewers $s^2 = 5.067$). In this instance television viewing was associated with heterogeneity, despite the mainstreaming pattern. A researcher who had not included and analyzed a measure of perceived reality in his or her data set might conclude incorrectly that heavy viewers individually were more uniform than were light viewers.

Figure 4 About Here

In a widely cited critique of cultivation research, sociologist Paul Hirsch (1981) argued that the various theoretical ideas associated with it fail to meet the Popperian criterion of falsifiability. Concepts such as mainstreaming and resonance, according to Hirsch, could

be used to account for virtually any research finding. In particular, a finding that equal percentages of light and heavy users of the medium provided a "television answer" to some question probing cultivation would not falsify the theory, according to Hirsch. Researchers could claim that both mainstreaming and resonance were occurring simultaneously, pulling viewers in opposite directions, he said. Resonance might have raised some viewers above the threshold for a tv answer, according to Hirsch, and mainstreaming perhaps had coaxed others below it. Although Hirsch referred to comparisons involving averages and percentages, one could make a related point concerning uniformities. In any empirical situation, a researcher may well find mainstreaming-type patterns, creating homogeneity among heavy viewers, as well as resonance-like forms that contribute to heterogeneity among those spending lots of time with the medium. In specific empirical situations, these tendencies could even cancel each other out, equalizing dispersion among people with different patterns of television usage.

Therefore, in research situations involving hypotheses about uniformities, it seems advisable to test not only whatever theoretically derived interactions one may have, but also to examine variances or other indicators of within-group dispersion. Unequal variances cannot be produced by linear combinations of variables (Downs & Rocke, 1979). They suggest the presence of neglected interaction involving, for example, measured and unmeasured variables (Downs & Rocke, 1979; Perry, 1986). In the above example, a researcher who had not measured perceived reality would have found unequal variability among the four groups shown in Figure 3 (s^2 = 5.14 within each group of heavy

television viewers and s^2 = .86 within each group of light users). Had within-group variances been equal among these four groups, one could plausibly assume that no additional interaction is present. Only then could one safely conclude, after identifying the mainstreaming pattern, that heavy viewers as a group were more uniform than were the light viewers.

The use of inferential statistical tests for unequal error variation (heteroscedasticity) is one means of examining uniformities. It is controversial, because of the restrictive assumptions (such as error normality) that many tests require and their sometimes lack of robustness to violations of these assumptions. Unequal error variation and nonnormality of error frequently occur together (Downs & Rocke, 1979), exacerbating such concerns. On the other hand, statisticians have developed apparently reliable test statistics that apply in many contexts, especially experimental designs (see a discussion in Perry, 1986). Regardless whether one employs statistical tests, however, researchers should at least measure variation, rather than just visually examine the residual patterns. If one has equal error variances and unequal numbers of observations at different levels of an independent variable, for example, the ranges associated with the larger groups will tend to be greater, creating an appearance of unequal variation.

The Table 1 example presented data like those obtained by experimental or quasi-experimental designs. Frequently, media-effects researchers use correlational designs and multiple-regression techniques that do not permit comparisons of within-group variances. They may not have the repeat observations at all combined levels of the various independent variables used that are needed to calculate and compare

within-group variances. Perhaps as a result, the mass-communication literature contains almost no examples of use of methods designed to test hypotheses about the uniformity of individual responses.

What has appeared recently, in regression analyses, is the use of dependent variables measuring either the absolute (Gerbner et al., 1982; Swindel & Casey, 1985) or the squared (Korzenny, Del Toro, & Gaudino, 1987) deviation from sample attitude means. Such variables may have originated with one of Hirsch's (1981) criticisms of the mainstreaming concept. He complained that no baseline, such as the grand mean, existed for determining the mainstream of a distribution; rather, it simply occurs at whatever point heavy viewers from different social groups happen to converge. Following this critique, Gerbner et al. (1982) used the absolute deviation from sample midpoints as a dependent variable in studying the impact of television on people's political self-designations. The analysis allowed Gerbner et al. (1982, p. 13) to report that "heavy viewers consistently show less dispersal around the sample mean." They trichotomized viewing into light, medium, and heavy categories. Evidently, they deleted medium viewers from these analyses and compared only light and heavy viewers. In mainstreaming research, the use of such a procedure may make theoretical sense.

Readers should not infer, however, that heavy viewers necessarily were more uniform, as a group, than were light viewers. Such dependent variables do <u>not</u> allow one to form conclusions about variance effects. Rather, they can reflect other factors. For example, assume that some form of mass-media exposure has a uniform impact on an attitudinal measure. If one compares two groups--one that has been exposed and another that has not--the numerically larger of the two groups is likely

to have the smaller squared deviation from the dependent-variable grand mean.[2] In terms of a bivariate regression analysis, the squared deviation from from an overall mean is comparable to the within-group variance used in experimental designs only if predicted values of the dependent variable are exactly the same at all levels of the independent variable. In practice, this is not likely to occur, even when a nonsignificant relationship exists between the predictor and dependent variable. In fact, to the extent that a linear relationship exists between an independent and dependent variable, one is likely to observe the smallest squared (or absolute) deviations from the overall mean at middle ranges of the independent variable. The same principle applies with multiple-regression analyses.

Statisticians have developed tests for heteroscedasticity in regression analyses, although they are less well-known than are standard variance tests. For example, researchers can use the absolute values of residuals as indicators of spread (Glejser, 1969).[3] The absolute values then are regressed on the set on independent variables. In this manner one could test the impact of a media-orientation variable, such as television exposure, on homogeneity, controlling for demographics or other causally prior factors. Like many tests for heteroscedasticity, however, the Glejser test requires normality of the dependent-variable residuals, which in practice generally will not occur. Although the test is less sensitive to violations of this assumption than are many variance tests, its use still is a bit problematic.[4]

A viable alternative can be developed from suggestions by Downs and Rocke (1979) and Cohen and Cohen (1983). One could separately regress the media-orientation variable and the original dependent

variable on the demographics one wishes to control for. The residuals for the two variables would then be used (Downs & Rocke, 1979). One then could regress the new criterion variable upon the new independent variable and take the absolute values of the residuals--in effect, the residuals of the residuals. None of these procedures uses inferential tests or, as a result, requires error normality. Finally, a researcher could perform the only statistical test needed, on a rank-order correlation coefficient to determine whether a monotonic relationship[5] exists between the residual independent variable and absolute values of prediction error. Such a test does not require normality assumptions.[6] Cohen and Cohen (1983, p. 129) suggested computing the rank correlation between predicted values and absolute residuals in a multiple-regression context. Such an overall test for heteroscedasticity would not allow researchers to test hypotheses about whether individual independent variables contribute to homogeneity, however.

The above discussion applies in situations in which researchers use dependent variables measured at the interval or ratio (or perhaps ordinal) levels needed for regression analyses. Uniformities also can be examined with qualitatively measured variables. The standard chi-square tests for contingency tables, like many nonparametric statistics, reflect both differences in location (e.g., mode) and differences in dispersion, however. On the other hand, Thorngate (1975) discussed tests for frequency tables that distinguish between these differences. For example, a researcher might categorize responses in an experiment into six nominal types. Within both an experimental and control group, the rank order of frequency might be almost identical among the categories. A researcher could use a support test to examine whether

the dispersion changed. Thorngate provided examples illustrating the distinction. In mass communication, Chaffee and Wilson (1977) used an alternative to Thorngate's method, an information-theoretic measure of nominal diversity, to examine the uniformity of public agendas in different communities.

A final implication of mass-media effects on variability

At least one implication of research concerning media-influenced uniformities may not be entirely obvious. Even if some form of mass communication contributes to less diversity in attitudes or behavior among those exposed, all people within the society will not necessarily be more homogeneous, as a group. Everyone will not be exposed, at least to the same extent, and the media content may both change the uniformity and the central location of attitudes or behavior. In instances in which the average is changed in the direction of previously unusual responses, one may observe greater variability within the society after, rather than prior to, introduction of the media stimulus. For example, assume that U.S.-style televised advertising makes those people within a developing nation who are exposed to it identically, and very, anxious to adopt Western clothing styles. Prior to the introduction of such advertising, assume that a degree of variation was present in such desires, but that most expressed little desire to emulate Western dress. Finally, assume that only about half of the people within the society are exposed, and that the advertising effects are not relayed through interpersonal contacts to those who did not see the material. In this situation, one likely would observe much greater variation among

residents of the country after the advertising is introduced, even though those who saw the ads will be more uniform than will those who did not.

Notes

[1]All variances reported in this paper use the formula for samples, an unbiased estimator, rather than the formula for populations, which is a biased estimator when applied to samples, especially to small ones.

[2]For example, assume that we have two groups. The first has three observations with dependent-variable values of 1,2, and 3. The second has nine: 4, 4, 5, 5, 5, 6, 6, 6, and 7. The sample variances within each group are equal (consistent with a notion of uniform effects). The grand mean is 4.5. The average absolute deviation is 2.5 for the first group and 1.055 for the second group. There are a few instances in which the smaller group would have smaller average deviations, however. If the second group has observations of 1, 1, 2, 2, 2, 3, 3, 3, and 4, and the first group is as before, the within-group variances will be equal (=1) and the second group will have the larger average absolute deviation from the grand mean of 2.25: .8055 vs. .75.

[3]Goldfeld and Quandt (1972) discuss a variation of the Glejser test that uses squared, instead of absolute, residuals. Such a modification is equivalent to using the square root of the right side of a regression equation to predict the absolute deviation, and which approach is most appropriate depends upon the form of heteroscedasticity (Goldfeld & Quandt, 1972).

[4]See the discussion of the Glejser test in Goldfeld and Quandt (1972) and the points made about the the experimental analogue to the Glejser test, the Levene test, by O'Brien (1981).

[5]Of course, nonmonotonic forms of heteroscedasticity can occur,

as when people with moderate levels of television viewing exhibit the most variation on a cultivation index. Lemieux (1976) warns researchers using regression analysis, however, that a pattern of maximum variability in the middle range of an independent variable or predicted value will often be produced by sampling even when the error term in the population is constant.

[6]The Spearman rank-order correlation applies the formula for the Pearson product-moment correlation coefficient to ranked data. Some statisticians might disagree with its use on residual data (in effect, a partial rank-order correlation), due to an old controversy concerning the application of parametric statistics to ordinal data. If one accepts arguments for the use of interval-level statistics with ordinal data (cf., Labovitz, 1970), its use in this context is reasonable. The degrees of freedom used for significance tests, however, should be adjusted downward by the number of variables used as controls.

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Table 1

Hypothetical Mean Scores on a Mean-World Index as a Function of Race, Television Viewing, and Perceived Reality of Television Content

TV Viewing	Level of Perceived Reality: Low	High
Whites		
Light	2	3
Heavy	3	7
Blacks		
Light	4	5
Heavy	4	8

Note. All cells have four observations each and sample variances of .67.

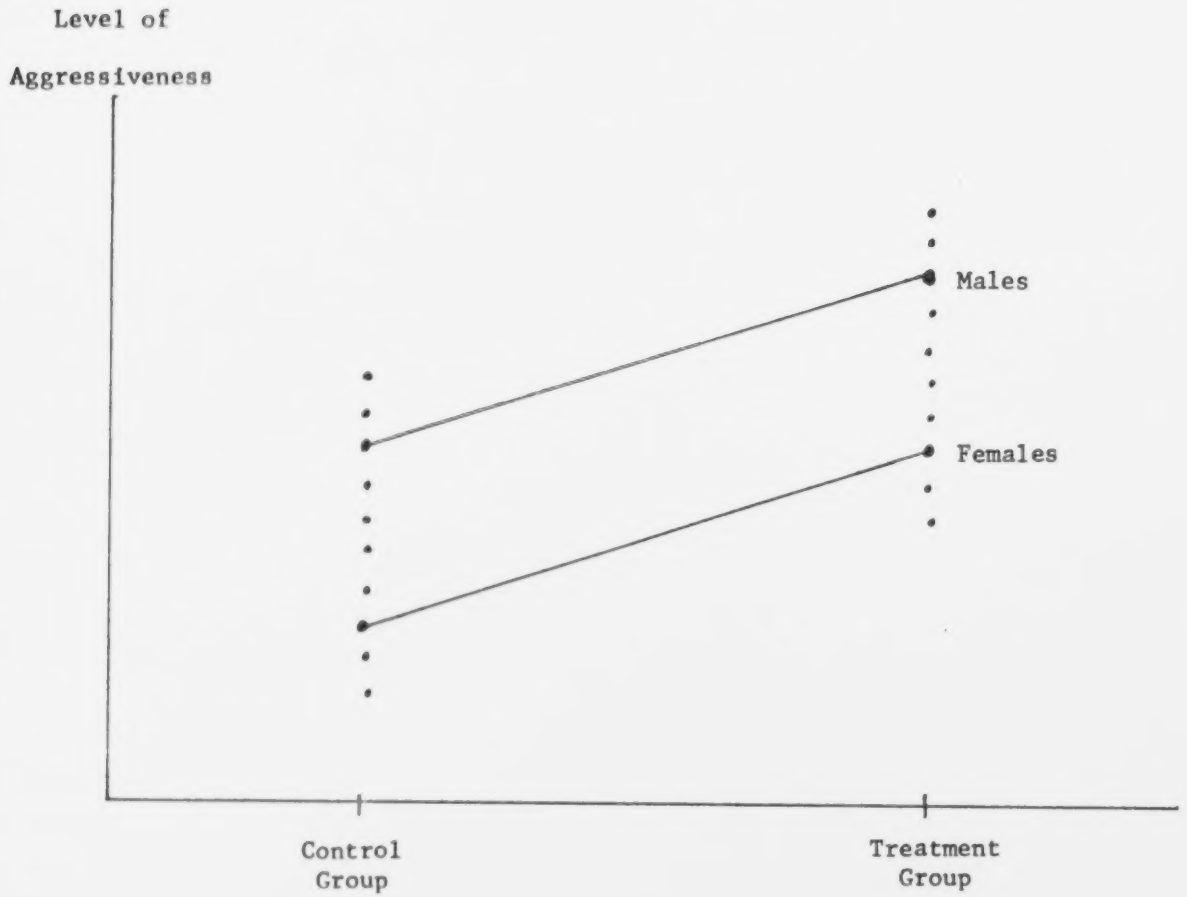

FIG. 1. Hypothetical scores on a measure of aggressiveness, illustrating uniform media effects for males and females exposed to a television-violence experimental treatment.

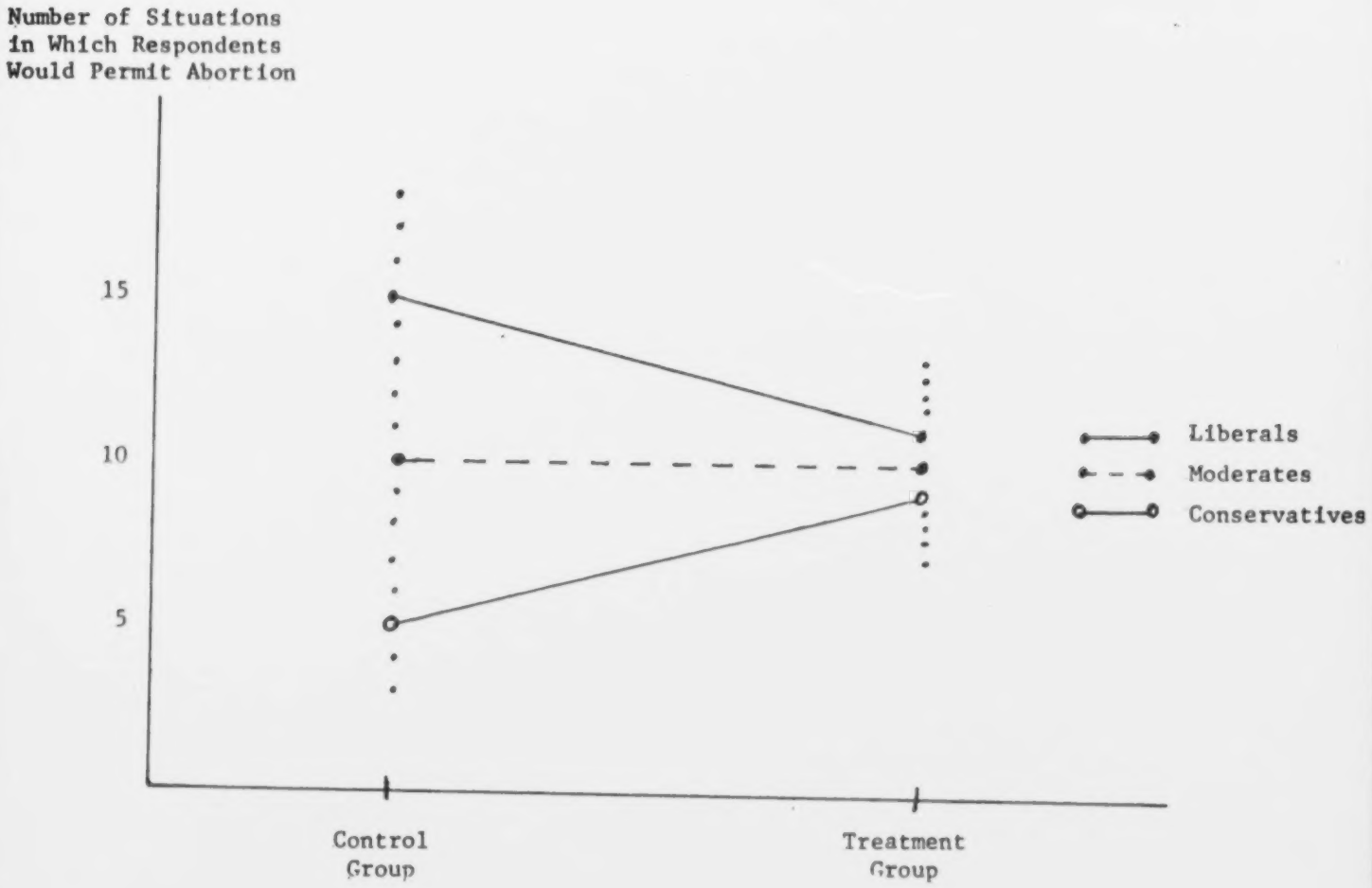

FIG. 2. Hypothetical scores on a measure of acceptance of abortion, illustrating a relative uniformity of response among liberals, moderates, and conservatives who were exposed to a persuasive message advocating a "middle" position on the abortion controversy.

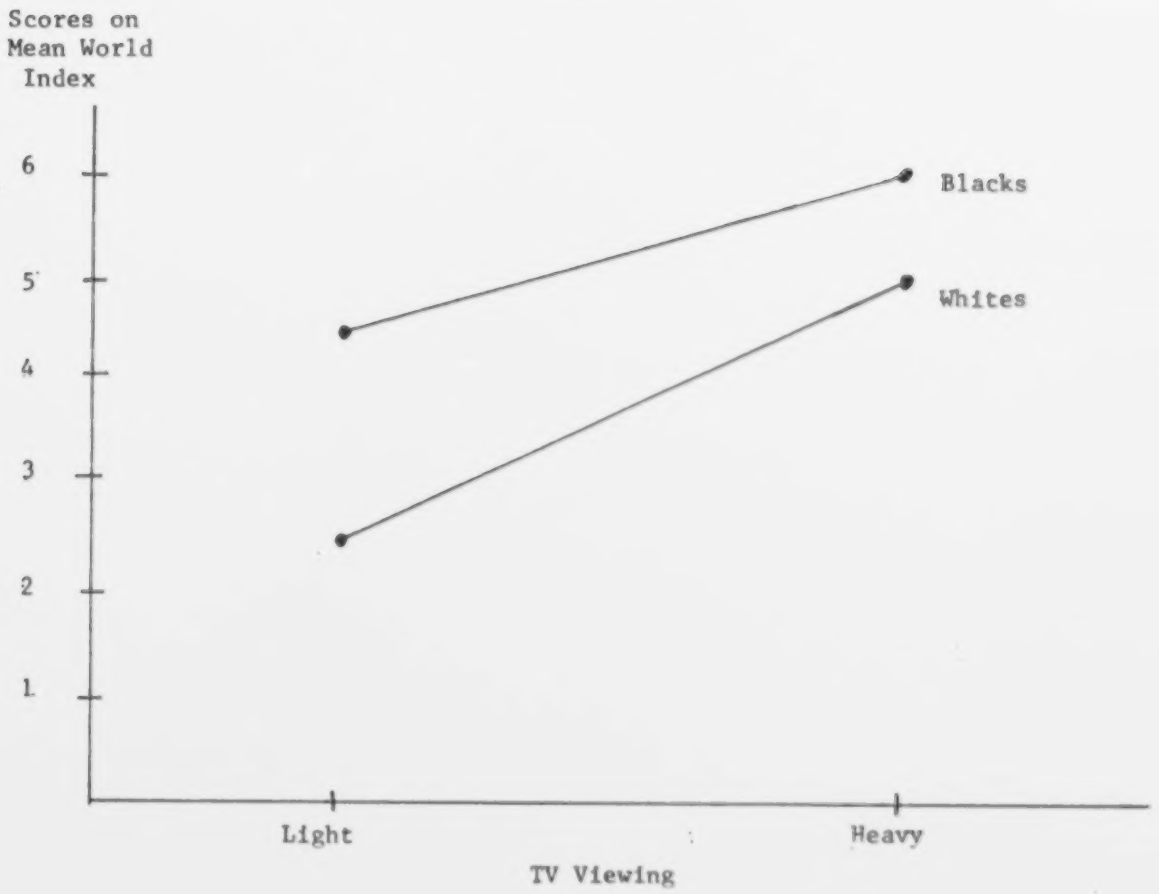

FIG. 3. Hypothetical mean scores (from Table 1) on an index of cultivation, collapsed across levels of perceived reality and illustrating mainstreaming effects, for black and white light and heavy viewers.

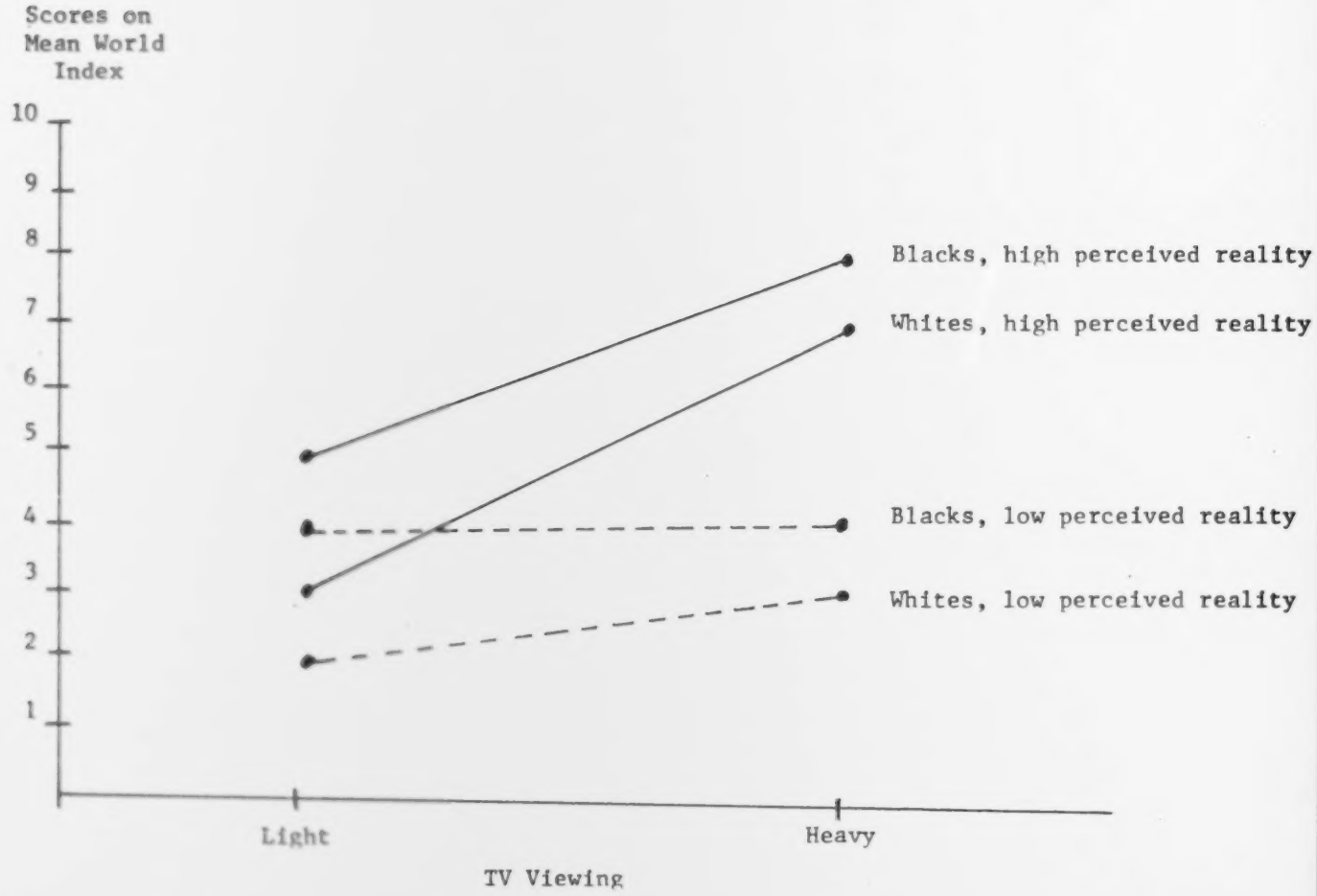

FIG. 4. Hypothetical mean scores (from Table 1) on an index of cultivation for black and white light and heavy viewers at two levels of perceived reality of television entertainment programming.